

## **CLAIMS**

*What is claimed is:*

1. A method for producing a variance reconstruction of variations between an object and a standard comprising:
  - acquiring object projections of the object from a plurality of different perspectives;
  - generating variance projections from the object projections by comparing the object projections with stored standard projections having corresponding perspectives; and
  - generating the variance reconstruction from the variance projections.
2. The method of claim 1 wherein the object projections each comprise a two-dimensional map of radiation intensity and a set of positional data that define the perspective of the object projection.
3. The method of claim 2 wherein the two-dimensional map of radiation intensity comprises a two-dimensional map of X-ray radiation intensity.
4. The method of claim 1 wherein comparing the object projections with stored standard projections having corresponding perspectives comprises determining differences between the corresponding object and standard projections.

5. The method of claim 1 wherein generating the variance reconstruction from the variance projections comprises identifying variant portions of the variance projections.
6. The method of claim 5 wherein identifying variant portions comprises comparing intensity maps of the variance projections to a threshold.
7. The method of claim 5 wherein identifying variant portions comprises describing the locations of the variant portions within the intensity maps.
8. The method of claim 7 wherein describing the location of a variant portion comprises identifying pixels that define a perimeter of the variant portion.
9. The method of claim 1 further comprising adjusting registrations of the object projections relative to the standard projections having corresponding perspectives before generating variance projections.

10. A method for automated tomography inspection comprising:
  - acquiring object projections of an object from a plurality of different perspectives;
  - generating variance projections from the object projections by comparing the object projections with stored standard projections having corresponding perspectives; and
  - evaluating the variance projections to qualify the object.
11. The method of claim 10 wherein the object projections each comprise a two-dimensional map of radiation intensity and a set of positional data that define the perspective of the object projection.
12. The method of claim 11 wherein the two-dimensional map of radiation intensity comprises a two-dimensional map of X-ray radiation intensity.
13. The method of claim 10 wherein generating variance projections comprises determining whether a sufficient number of variance projections have been acquired to assess the quality of the object.
14. The method of claim 10 wherein evaluating the variance projections to qualify the object comprises passing or failing the object.
15. The method of claim 10 wherein evaluating the variance projections to qualify the object comprises grading the object.

16. The method of claim 10 wherein evaluating the variance projections to qualify the object comprises generating a variance reconstruction of the variations between the object and the standard.
17. The method of claim 16 wherein generating the variance reconstruction comprises determining variant portions of the variance projections.
18. The method of claim 16 wherein evaluating the variance projections to qualify the object comprises evaluating the variance reconstruction.
19. The method of claim 18 wherein evaluating the variance reconstruction comprises identifying defects in the variance reconstruction.
20. The method of claim 19 wherein evaluating the variance reconstruction comprises determining a figure of merit from the defects identified in the variance reconstruction.

21. A computer-readable medium comprising program instructions for
  - acquiring object projections of an object from a plurality of different perspectives;
  - generating variance projections from the object projections by comparing the object projections with stored standard projections having corresponding perspectives; and
  - generating a variance reconstruction from the variance projections.
22. The computer-readable medium of claim 21 further comprising program instructions for adjusting registrations of the object projections relative to the standard projections having corresponding perspectives.
23. A computer-readable medium comprising program instructions for
  - acquiring object projections of an object from a plurality of different perspectives;
  - generating variance projections from the object projections by comparing the object projections with stored standard projections having corresponding perspectives;
  - evaluating the variance projections to qualify the object.
24. The computer-readable medium of claim 23 further comprising program instructions for generating a variance reconstruction of the variations between the object and the standard.

25. The computer-readable medium of claim 23 further comprising program instructions for determining variant portions of the variance projections.
26. The computer-readable medium of claim 25 further comprising program instructions for generating a variance reconstruction of the variations between the object and the standard from the variant portions of the variance projections.
27. An apparatus for producing a variance reconstruction of variations between an object and a standard comprising:
  - an imaging system including
    - a stage for supporting the object, and
    - a radiation source and a detector adjustably positionable relative to the object to define perspectives thereof; and
  - a computer system in communication with the imaging system and configured to acquire object projections of the object from a plurality of different perspectives,
  - generate variance projections from the object projections by comparing the object projections with stored standard projections having corresponding perspectives, and
  - generate the variance reconstruction from the variance projections.

28. The apparatus of claim 27 wherein the computer system is further configured to  
adjust registrations of the object projections relative to the standard projections  
having corresponding perspectives.
29. The apparatus of claim 27 wherein the computer system is further configured to  
evaluate the variance reconstruction to qualify the object.
30. An apparatus for producing a variance reconstruction of variations between an object  
and a standard comprising:  
means for acquire object projections of the object from a plurality of different  
perspectives,  
means for generate variance projections from the object projections by comparing  
the object projections with stored standard projections having  
corresponding perspectives, and  
means for generate the variance reconstruction from the variance projections.